REMARKS

In the Office action mailed from the United States Patent and Trademark Office February 27, 2007, claims 34, 48-50, 55 and 60-77 were rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement; claims 34, 48-50, 55 and 60-77 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention; claims 31-34, 42-47, 51-54, 56-65, 69-72 and 74-77 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Schadow et al.; claims 31-34, 42-47, 51-54, 69-72 and 74-77 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Brock et al.; claims 31-34, 42-47, 51-54, 56-65, 69-72 and 74-77 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Tsukahara et al.; and claims 31-34, 42-47, 51-54, 56-65, 69-72 and 74-77 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Falco et al.

Specification

In the pending office action, the specification was objected to as failing to provide a proper antecedent basis for a calculated distance; the flow regulator functioning to optimize air flow; reduce separation; reduced noise; a dynamic fluid flow regularly capable of adjusting; a removable pressure recovery drop; means for effectuating vector positioning; a fluid flow regulator that is removeably attachable; and a dynamic fluid flow regulator comprising an adjustable element. Applicant respectfully submits that the specification does provide proper support for the listed elements. In particular, Applicant draws Examiner's attention to the following sections of the specification which deals directly with the listed elements above.

The background of the invention (pages 2-5) details basic scientific principles which govern fluid flows in relation to objects. The background indicates that as fluid moves over an objects surface the molecules adjacent to the surface of the object have the affect of adhering to the surface, thus creating negative forces caused by the collision of these molecules with other molecules moving in a free stream. Various characteristics, as outlined in the background, effect

the resistance the fluid experiences at our near the object. This is commonly referred to as the boundary layer because it occurs at the boundary between the fluid and the object. The collision of molecules at the surface of an object create inefficient and unpredictable fluid flows, such as drag and inevitably turbulence.

The study of aerodynamics over surface has been extensive and great efforts have been made to produce completely laminer fluid flows. Attempts to improve fluid flow and efficiency have traditionally accept the principle that the smoother the surface the material is passing over, the lower the amount of turbulence. Thus, efforts have been generally focused on minimizing the size of surface features across the materials flowing. However, turbulence occurs at the rigid body/fluid or gas interference also known as the boundary layer. After a certain threshold is achieved, the flow closer to the rigid body is much slower than the flow outside the boundary layer. Thus, the pressure directly in the orthogonal direction from the rigid body is less than the pressure down flow. This causes the kinetic energy in the molecules in the boundary layer to move in the direction of lowest pressure or away from the rigid body. This change in the direction of the flow from moving in the direction of the flow to moving across the direction of the flow in the boundary layer creating vorticies within the boundary layer and along the rigid layer. These vorticies create drag because the direction of the flow, as well as the kinetic energy of the particles is not in the down flow direction alone, but in a variety of directions. As a result, large amounts of energy are required to overcome the drag force, lowering the flow rate and efficiency.

The summary of the invention and the detailed description of the preferred embodiments provide additional elaborations of this concept. Beginning on page 17 of the specification, the Applicant has indicated that the invention involves a pressure recovery drop 26 which follows the leading edge 18 in the direction of the fluid flow provides a drop in the surface in which the fluid 2 is flowing over. The pressure recovery drop is preferably is orthogonal or substantially orthogonal.

Page 20 of the specification describes the optimal pressure recovery point 34, wherein the optimal recovery point is defined at the points or locations about the surface 14, at which there is imbalance or unequal pressure gradient forward and after the fluid to thus create and adverse pressure within internal flow device 12, which adverse pressure gradient induces friction and pressure drag which ultimately increases the separation potential of the fluid. The location of each optimal pressure recovery points is calculated by a determination that dictates placement of fluid flow regulator 10. Moreover, the location of the optimal pressure recovery points will vary between internal flow devices, depend on the velocity and fluid, pressure within the internal flow device, viscosity of the fluid, density of the fluid and physical characteristics of the internal flow device.

Figures 2A and 2B show an exemplary internal flow device. These figures illustrate the effective touch and go of pulse flow phenomenon created by fluid flow regulator 10 featured within internal flow device 12. Continuing on page 21, the specification indicates that a fluid flow regulator 10 is never randomly positioned, but instead strategically placed at an optimal pressure recovery point. The fluid briefly detaches from the surface indicated by upward arrows in the figures and then subsequently reattaches almost instantaneously, wherein fluid 2 is reenergized. This touch and go phenomena functions to recover pressure at the optimal pressure recovery point 34, wherein the pressure gradient is reduced and the pressure differential cured. All this effectually allows fluid 2 to continue in a detached state as well as in a return state of equilibrium. The drop in pressure is made instant so that the adverse dynamic forces acting on fluid 2 may be overcome and eliminated.

Page 22 provides additional commentary regarding the methods for determining the location of subsequent optimal pressure recovery points.

Page 25 of the specification provides greater detail regarding the touch and go phenomena previously discussed in the specification. Effectively providing disclosure relative to

a calculated distance; a flow regulator functioning to optimize air flow; reduce separation; and reduce noise.

Page 32 of the specification indicates that in addition to the contemplation of multiple fluid flow regulators, the present invention further contemplates differing heights between one or more fluid flow regulators.

Page 35 of the specification adds, beginning with the discussion of Fig. 7A, additional material to the discussion, particularly germane to exemplary embodiments of the present invention which include dynamic fluid flow regulators. The subsequent disclosure provides detail relating to a dynamic fluid flow regulator capable of adjusting. A movable pressure recovery drop, may comprise means for effectuating vector positioning, a fluid flow regulator that is removabley attached and a dynamic fluid flow regulator comprising an adjustable element. In particular, page 36 indicates a dynamic fluid flow regulator 10, and particularly adjustable plane 82, may also be designed to comprise transverse movement that allows an adjustable plane 82 to move bidirectionally in a horizontal manner to preserve a tight relation between end 86 and drop face 30, and to insure drop face 30 is perpendicular to the surface 13. In addition, end 86 preferably seals tightly against drop face 30 at all times and at all vertical positions.

Page 37 indicates that continuously altering the potential pressure recovery involves monitoring the pressure gradient acting upon the surface to determine whether the pressure gradients are strong enough to induce separation of the fluid from the boundary layer created as a long surface 14 from the flow of the fluid.

Page 38 continues, as conditions change, adjusting plane 82 maybe adjusted up or down as indicated by the arrows to increase or decrease the height of the drop face 30. Adjusting plane 82 is adjusted by rotating the attachment means 84 connecting adjusting plane 82 to device 12. Degree adjusting plane 82 is adjusted as the calculated determination to be made considering all known relevant factors. Adjusting plane 82 may also move horizontally back and forth as

needed. If adjusting plane 82 is not allowed to move horizontally, end 86 would travel along an arc which would separate from drop face 30 at some point thus frustrating the intended function effect of fluid flow regulator end.

Page 39 continues with a description of Fig. 7B which illustrates an exemplary embodiment of a dynamic fluid flow regulator. In this embodiment, a dynamic fluid flow regulator also comprises an adjustable plane 90. However, in this embodiment, adjusting plane 90 moves vertically up and down to adjust pressure recovery drop 26 and drop face 30. Adjusting plane 90 is cause to move up and down by actuating one or more lifts 98. Extensive disclosure related to exemplary internal flow device systems begins on page 44 of the specification and this includes a discussion of Figs. 8, 9, and various examples.

Because the specification provides adequate disclosure related to the requested elements, Applicant requests that the objection be withdrawn at this time.

Drawings

In the pending office action, the drawings were objected to and the Examining attorney indicated that the drawings must show every feature of the invention. Accordingly, Applicant respectfully provides the following discussion which is provided as an effort to assist the Examiner in identifying the various requested elements in the figures.

The concept of "a calculated distance" is discussed at length as indicated above in the specification. Each embodiment of the invention as disclosed in the figures show a drop face which must necessarily be a calculated distance from the leading edge of the object subject to a given flow pattern. As indicated in the discussion, the distance and position of the drop face relative to the leading edge is calculated to be placed at various positions in order to minimize flow disturbance and as indicated in the specification may be a dynamic apparatus which allows for movement of the drop face in various planes. Accordingly, Applicant respectfully submits that each of the disclosed embodiments show a calculated distance.

As indicated above, the specification is filled with a discussion related to "the flow of the regulator functioning to optimize air flow." In particular, please note the background discussion and lengthy discussion found in the detailed description of the preferred embodiments beginning on page 21 of the specification. As indicated in the specification, introduction of a drop face decreases turbulence and helps to optimize the laminar flow of air over a surface. Accordingly, each embodiment which shows a drop face demonstrates a preferred embodiment of a method for optimizing air flow over a surface according to the present invention. Accordingly, Applicant submits that the drawings objected to do show this feature.

Likewise, the concepts of reducing separation and reducing noise are dealt with by both the theoretical discussions and the discussion related specifically to the present invention which details the present invention's methods for optimizing laminar air flow which necessarily reduces air flow separation and noise which is a byproduct of air turbulence. Accordingly, each embodiment disclosed in the figures shows embodiments related to the reduction of separation and noise.

As indicated above "a dynamic fluid flow regulator capable of adjusting" is discussed throughout the specification and is particularly illustrated in figure 7A and 7B. Likewise "removable pressure recovery drop"; "means for effectuating vector positioning"; "a fluid flow regulator that is removeably detachable"; "a dynamic fluid flow regulator comprising an adjustable element" are all features discussed at length in the specification and illustrated in the drawings. For example the adjustable/ removable means for affecting vector positioning are labeled with reference characters 82A, 84, 82B, 90, and 98.

Because each of the listed elements are shown in the present drawings and are thoroughly discussed in the specification, Applicant respectfully requests that the objections to the drawings be withdrawn.

Claim Objections and Claim Rejections under 35 U.S.C. § 112, first paragraph

Claims 34, 48-50, 55, 60-77 are rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Examiner indicates that the specification fails to teach the following: how the calculated distance is calculated, how optimization takes place, how separation is reduced, how noise is reduced, how the fluid flow regulator is adjusted, how a movable pressure recovery drop works, means for effectuating vector positioning, how can a fluid flow regulator be removable, and where in the specification is a dynamic fluid flow regulator with adjustable elements taught. As indicated above in the lengthy section found under the heading "Specification," each of the ideas with which the Examiner has concern is discussed at length. Accordingly, Applicant respectfully requests that the § 112/ enablement rejection be withdrawn.

Claims 34, 38-50, 55 and 60-77 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant believes that the specification contains lengthy disclosure discussing the matter as evidenced in the remarks section entitled "Specification" above. Accordingly, the terms calculated distance, optimize error, reduce noise, and reduce separation in claim 34 are terms which find support in the specification as originally filed. Accordingly, Applicant respectfully requests that the § 112 second paragraph rejection be withdrawn at this time.

Regarding claims 48 and 66 particularly, please note that appropriate correction has been made.

Claim Rejections under 35 U.S.C. § 102 (b)

M.P.E.P. § 2131 sets forth the standard for a rejection of a claim as anticipated under 35 U.S.C. § 102. "To anticipate a claim, the reference must teach every element of the claim." M.P.E.P. § 2131 states further,

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987). . . . "The identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

Applicant respectfully submits that the references cited by the Examiner fail to teach every element of the claim set as provided herein for the following reasons.

1.) Rejections under Schadow et al.

Schadow discloses a dump combustor with non-coherent flow. Schadow teaches away from the present invention by disclosing a method for utilizing a "dump" to generate vortexeswhich mix fuel and air for combustion down stream from the dump. Further, Schadow requires a substantially non-circular dump so that the vortexes induced by the dump are aperiodic, and flow down stream so flow down stream is non-coherent. Schadow fails to disclose each of the limitations cited in the amended claim set. In particular, Schadow fails to disclose vertically positioning the fluid flow regulator. Further, Schadow teaches an invention which is utilized to produce air turbulence, not decrease air turbulence. Accordingly, while Schadow discloses a dump which in picture form may appear to be roughly analogous to the concept of a drop face, in the present invention, the positioning and size of the dump are calculated to produce a substantially different result. Accordingly, Schadow fails to read on the claims of the present invention.

2.) Rejections under Brock et al.

Brock discloses a combustion chamber having reduced NO_x emissions. Like Schadow, Brock is designed to produce efficient combustion, which results from the formation of eddie currents within the chamber. Accordingly, Brock discloses a method for producing air turbulence not for reducing air turbulence. Because Brock teaches an invention which would

destroy the function of the present invention, Brock does not read on the present invention. Further, Brock fails to disclose all the elements claimed in the present invention. Particularly, Brock fails to disclose dynamic and vertical positioning. Accordingly, Applicant requests that rejections over Brock be withdrawn at this time.

3.) Rejections under Tsukahara et al.

Tsukahara discloses a gas turbine combustor which includes a step cylindrical tube defining first, second and main combustion spaces. The cross sectional areas illustrated in Tsukahara are designed to maintain stable combustion by diluting the air supply openings so that 25 to 32 percent of the total air supplied in the combustion chamber are used as primary air in the first combustion space 38-50% as secondary air in the second combustion space; and less than 30 percent as diluting air in the main combustion space. Accordingly, Tsukahara is drawn to an invention for mixing air within a determined space and reducing the volume of the initial air in the same space. Accordingly, while Tsukahara discloses through figures the concept of a step, the disclosed invention would destroy the benefits acquired according to the present invention. Accordingly, Applicant requests that Tsukahara be withdrawn as art cited against the present case.

4.) Rejections under Falco

Falco discloses rearward facing micro steps that are provided in a surface of a wall to reduce shear friction drag caused by the walls surface. However, Falco fails to disclose a nozzle comprising: an intake for initially receiving a fluid therein; a surface relating with said intake that receives fluid flow thereon; a discharge providing an exit for said fluid from said nozzle; and at least one dynamic fluid flow regulator featured and operable with said surface, said fluid flow regulator comprising: a leading edge, a trailing edge, and an orthogonal pressure recovery drop

extending between said leading and trailing edges to form a down step, said pressure recovery drop comprising at least one drop face, and means for increasing the height of said drop face. Because Falco fails to disclose each and every limitation of the present invention, Falco fails to render the claims of the present invention obvious. Accordingly, Applicant respectfully requests that all rejections over Falco be withdrawn at this time.

CONCLUSION

Applicant(s) submits that the amendments made herein do not add new matter and that the claims are now in condition for allowance. Accordingly, Applicant(s) requests favorable reconsideration. If the Examiner has any questions or concerns regarding this communication, the Examiner is invited to call the undersigned.

DATED this 23 day of May, 2007.

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